this curve of electromotive forces as ordinates, and currents as abscissæ, gave just the information required regarding the action of the machine." Dr. Hopkinson also showed how the characteristic curve of the dynamo could be used to give the conditions under which an arc lamp could be made to work. He was, in fact, a pioneer in the scientific study of dynamo-electric machinery and its uses. In conjunction with his brother, Mr. E. Hopkinson, he was the first to apply the idea of the magnetic circuit, in a consistent manner, to the discussion of the results of experiments on different types of dynamo, and his contributions to this subject have been most valuable in suggesting new methods and machines. His papers on the behaviour and capabilities of direct current machines, and of alternators, have proved of the greatest service to practical electricians, and are counted among the classics of the subject

Dr. Hopkinson was professor of electrical engineering in King's College, London, and a member of the Councils of the Institutions of Civil and Mechanical Engineers. He was the "James Forrest" lecturer of the former Institution in 1894, and his discourse on the service mathematics has rendered and can render to engineers and engineering was printed at the time in these columns. In himself he represented the rare combination of mathematical and mechanical knowledge, and the results of his life's work stand out as the clearest evidence of the close relationships between pure and applied science. It is a mournful task to have to chronicle the death, in such tragic circumstances, of an investigator who has worked so well for the increase of knowledge and the advancement of electrical engineering.

NOTES.

THE Fourth International Congress of Physiologists held its meetings with great success at Cambridge last week from Tuesday, August 23, to Friday, August 27, inclusive. It was probably the largest assembly of the kind that has yet met. Prof. Michael Foster was President. The following nationalities were represented: Austria, Belgium, Canada, Denmark, Egypt, France, Germany, Great Britain and Ireland, Holland, Hungary, India, Italy, Japan, Roumania, Russia, Sweden, Switzerland, and the United States. The offer of Profs. Mosso (of Turin), and Golgi (of Pavia), for the reception of the Fifth Congress in Italy in 1901 was cordially accepted. The Organising Committee for the Fifth Congress was elected, to consist of the following names: Angelo Mosso (Turin), President. Chr. Bohr (Copenhagen), H. P. Bowditch (Harvard), A. Dastre (Paris), M. Foster (Cambridge), L. Fredericq (Liège), P. Grützner (Tübingen), P. Heger (Brussels), H. Kronecker (Bern), W. Kuhne (Heidelberg), C. S. Sherrington (Liverpool), and W. Wedenskij (St. Petersburg). The place of meeting that has been chosen for 1901 is the Physiological Institute of the University, Turin, and the time the latter half of September. The local arrangements for the present Congress proved very satisfactory. The opinion was generally expressed that the simultaneous session of the sister Congress of Zoologists at Cambridge, far from proving inconvenient, considerably enhanced the pleasure of the meeting.

THE Reale Accademia dei Lincei has recently elected the following men of science as associates and foreign members of the Academy:—National Associates: in physics, Profs. A. Righi, A. Roiti, and A. Pacinotti; in geology and palæontology, Signore G. Scarabelli; in zoology, Prof. C. Emery. Correspondent in mechanics, Prof. C. Somigliana. Foreign Members: in mechanics, Prof. A. G. Greenhill and V. Voigt; in physics, Prof. W. C. Röntgen; in geology and palæontology, Prof. A. Karpinsky and Sir Archibald Geikie; in zoology, Prof. E. Ray Lankester.

IN a special number of their *Atti*, the Reale Accademia dei Lincei, of Rome, announces the recent awards of prizes given by the King of Italy for the period ending in 1895. For the Royal prize for mathematics, eight competitors sent in no less than about ninety written and printed memoirs; and after a critical examination of these, the judges have now divided the prize equally between Prof. Corrade Segre and Prof. Vito Volterra. The papers submitted appear to have been of a very high standard of excellence, and are stated to form a worthy sequel to the works of Betti, Brioschi, and other illustrious Italian mathematicians. The award of the Royal prize for social and economic science has been deferred for a period of two years. A similar decision has been arrived at in the case of the prize for astronomy, but a sum of 3000 lire has been awarded to Prof. Filippo Angelitti in consideration of his valuable work in editing and discussing the unpublished writings of Prof. Carlo Brioschi. The prize for philology has been divided between Prof. Angelo Solerti and Prof. Remigio Sabbadini, and finally a Ministerial prize of 1500 lire for natural science has been awarded to Prof. L. Paolucci for his monograph on the fossil plants of the Ancona district.

PROF. BEHRING'S action in applying for a patent in the United States as sole inventor of diphtheria antitoxin excited surprise, but the announcement that the authorities at Washington have recently decided to grant the patent has (says the *Lancet*) caused a feeling of something like consternation among the American manufacturers of antitoxin. It was in January 1895, that Prof. Behring—his assignees being the Höchst-Farbwerke, the manufacturers of the serum in Germany—first applied for a patent for his diphtheria antitoxin; the application was then refused, and has been refused four times since on the ground that Prof. Behring was not the sole inventor of diphtheria antitoxin, and had consequently no right to claim a monopoly of the manufacture and sale of the same. However, in June of this year the patent officials at Washington overlooked their objections and granted the patent. But although Prof. Behring has succeeded in gaining a patent for his diphtheria antitoxin, it is the intention of the American manufacturers of antitoxin and the several Boards of Health to contest at every step his right to create a monopoly.

PARTICULARS of the life and work of Dr. William Pepper, whose death at Pleasanton, in California, was recently announced, are given in the *Lancet*, and are here abridged. William Pepper was born in August 1843, so that at the time of his death he was not quite fifty-five years of age. His father, Dr. William Pepper, was a prominent physician and Professor of the Theory and Practice of Medicine in the University of Pennsylvania, and in 1881 the son was elected to the same chair. In the same year he was elected Provost of the University, a post which he held until 1894. On his retirement from office he gave practical and munificent effect to his views upon the extension of the medical curriculum by a donation of 50,000 dollars, with a promise of 1000 dollars as an annual subscription for five years, towards an endowment fund to pay for greater teaching facilities for science in the University. In the same year the course was extended to four years. Prof. Pepper is known to the medical profession chiefly by his contributions to, and able editing of, the "System of Practical Medicine by American Authors." This System, which was published in 1885, did for medical knowledge in America what Ziemssen's Cyclopædia had done ten years previously in Germany. It systematised and correlated the varying scientific opinions of persons all chosen to write because of their position and claims to know, and thus presented to the student a comprehensive account of disease in a series of authoritative monographs. As a benefactor to the city of Philadelphia Prof. Pepper's actions were almost innumerable. He gave to the University the William Pepper Laboratory of Clinical Medicine in memory of his father; he inaugurated a system of commercial museums, to be connected with other museums in different parts of the country, wherein people might see specimens of the produce of all parts of the world; he secured immense donations for the Philadelphia Public Art Gallery, and he founded the Free Library. This by no means exhausts the list of Prof. Pepper's public works, and in him Philadelphia is deploring one of the most generous as well as one of the most distinguished of her sons, while the medical world has to mourn the loss of an enlightened man of science, a wise teacher, and a liberal leader.

The Indian Government has decided to send exhibits from the Forest and Geological departments to the Paris Exhibition, at a cost of about 3000*l*.

We regret to see the announcement that Mr. E. E. Glanville, of Trinity College, an assistant to Mr. Marconi, has met with his death by falling over a cliff three hundred feet high, at Rathlin Island, off the Antrim coast where he was engaged in experiments in wireless telegraphy.

Much interest was excited among the zoologists of the International Congress at Cambridge last week by the announcement of the discovery of the "first known Hyracoid form of the Tertiary formation." The skull upon which this important addition to our knowledge of the Mammalia is based was obtained in Samos, and belongs to the Stuttgardt Museum. It will be described by Prof. Osborn, of New York.

A Reuter telegram from St. Johns states that the steamer *Hope* has arrived there from Greenland, having transferred Lieutenant Peary and party to the steamer *Windward* at Port Foulke. The latter vessel sailed on August 13 for Sherrard-Osborne Fiord, her destination, having taken on board sixty dogs, sixty walruses, and ten natives of North Greenland. It has taken enough provisions for three years.

The ninth annual general meeting of the Institution of Mining Engineers will be held in Birmingham on September 13, 14 and 15, under the presidency of Mr. A. M. Chambers. Among the papers to be read at the meeting are:—"The Shelve and Minsterley Mining District of Shropshire," by Prof. Lapworth, F.R.S.; "The South Staffordshire Mines Drainage Scheme, with special regard to Electric Power Pumping," by Mr. E. B. Marten and Mr. Edmund Howl; "Treatment of Refractory Silver Ores by Chlorination and Lixiviation," by Mr. J. E. Breakell; "The Use of High-pressure Steam as a Possible Substitute for Gunpowder and other Explosives in Coal Mines," by Major-General H. Schaw.

The Berlin correspondent of the *Times* states that Herr Theodor Lerner, commander of the German Polar expedition, on his return to Hammerfest, despatched the following telegram to the German Emperor:—"To your Majesty the most humble announcement that the German North Pole expedition, by means of topographical observations made during a circumnavigation of the Island of King Charles, was able to determine its exact position. The ship *Helgoland*, which carried the expedition, is the first ship which has ever yet succeeded in forcing a passage from the south round the eastern coast of the island, which was accomplished in spite of the great quantity of ice and in face of contrary conditions of weather—a feat hitherto considered impossible." The German Emperor, immediately on receipt of this telegram, caused the following reply to be sent to Herr Lerner:—"I send my congratulations to the German North Pole expedition for the splendid success which German determination and circumspection have just achieved under your command.—William, I.R."

A decided change of weather has set in over our Islands during the past week, and the conditions now are quite normal to an ordinary summer. The excessive heat over the south-east of England lasted for about a fortnight, and hot as the days were in many cases they were, in comparison with average conditions, surpassed by the unusually warm nights. At the London reporting station of the Meteorological Office there were eleven nights in August during which the thermometer did not fall below 60°, and the Greenwich observations for the previous twenty years only show altogether eleven such warm nights. Fairly heavy rains have now fallen in all the northern and western districts, and rains of lesser intensity have gradually spread over the whole country. In the neighbourhood of London the rainfall has, as yet, been very small, and the total fall at present since the commencement of the month is only about one-third of the average. In many parts of England the rainfall has been very much below the average during the last eleven months, and there is at present no certainty that the lengthened period of dry weather is at an end. Cyclonic disturbances are just now arriving from the Atlantic with considerable frequency, and these are occasioning rains in many parts of our area. It is, however, not improbable that anti-cyclonic conditions with dry and warmer weather will again shortly set in.

Dr. G. Agamennone, in a recent paper in Gerland's *Beiträge zur Geophysik*, describes his attempt to calculate the velocity of the pulsations of the earthquake of Aïdin (Asia Minor), on August 19, 1895. They were registered by the Vicentini microseismograph at Padua, and the horizontal pendulum at Strassburg, the distances of these places from the epicentre being 1570 and 2010 km. respectively. Owing to the uncertainty of the best time-observations near the epicentral district, the estimates of the velocity are somewhat doubtful. The first recorded movements at the above places give velocities of 9·8 and 3·2 km. per sec. for the early vibrations, and 3·1 and 2·55 km. per sec. for those which gave rise to the maximum disturbance.

A few notes on the results of inquiries as to the effects and causes of the Indian earthquake of June 12, 1897, are given by Mr. R. D. Oldham in the general report just published on the work carried on by the Geological Survey of India during last year and the first quarter of this year, under the direction of Dr. C. L. Griesbach. An examination of available information leads Mr. Oldham to conclude that there is one, and apparently only one, supposition which will explain all the facts, and that is the existence, or the creation, of a nearly horizontal fracture or thrust plane along which the upper part of the earth's crust was pushed over the lower. This plane would nowhere come to the surface, and the movement of the upper layer against the undisturbed crust beyond the limits of the fracture would give rise to just that compression which would account for the conspicuous displacements of surface levels seen in the eastern part of the Garo Hills District, and less conspicuously to the east and the west. In this conclusion, Mr. Oldham thinks, an easy explanation of the area over which the shock had a maximum of destructive energy may be found without postulating an improbable depth for the focus. There is no necessity or reason to suppose that the thrust plane lies at any great depth from the surface, and it is possible that five miles may represent a maximum rather than a minimum value, but what the focus loses in depth it gains in area of action.

Machinery—the South African journal of engineering, mining, and science—announces that the State geologist, accompanied by Mr. David Draper, has gone to St. Lucia Bay to investigate the connection between the Karoo Beds of the Vryheid District with those of Natal and the High Veld. A geological section of the country will be made from Volkrust eastward, which should be of much value to geologists.

THE *Transactions* of the Edinburgh Geological Society (vol. vii. part 3) contains a large number of interesting papers and notes on geological subjects. Amongst the longer papers we notice two, by Mr. H. M. Cadell, on the geological features of the coast of Western Australia, and on the New Zealand volcanic zone, and one, by Mr. J. G. Goodchild, on desert conditions in Britain. In a footnote Mr. Goodchild states that during the past three years he has taught in his classes that the Torridonian rocks were formed under desert conditions, and that he is not aware that this idea has occurred to any other geologist. The point is important in view of Prof. Penck's recent discussion of the same subject.

IN the latest volumes of its *Memoirs* the Russian Geographical Society has published the diaries of three expeditions made in East Siberia many years ago, but the detailed accounts of which had hitherto remained unknown. Two volumes are given to two diaries of the mining engineer, I. A. Lopatin, who visited the northern parts of the Vitim plateau in the year 1865, and the next year travelled along the Lower Yenisei to Turukhansk. The former contains a wealth of minute descriptions of the granites, gneisses, and crystalline slates of the Vitim plateau, all described from Lopatin's samples by specialists, as well as of the mantles of basalt which cover large portions of the plateau along its north-western edge. The second volume is even more interesting, as on his journey down the Yenisei Lopatin met not only Laurentian and Huronian formations, but also widely-spread Silurian rocks, Quaternary deposits, and Post-Pliocene deposits of the Arctic Sea, very rich in sub-arctic shells (all fossils were described years ago by Fr. Schmidt in his "Mammuthexpedition"). The third volume of this series contains the diary of the remarkable explorer, A. L. Czekanowski, of whose expedition to the Lower Tunguska, the Olenek and the Lena, in 1873–75, Fr. Schmidt rightly says that it was richer in geological results than any of the expeditions that have explored Siberia. The results of this journey were well known through Czekanowski's preliminary reports, as well as through the descriptions of his palæontological and botanic collections by Oswald Heer, Lagusen, Moisisowicz, Fr. Schmidt, and Trautvetter. But a full description of the expedition was never published, and it is only now that Czekanowski's diary, which contains a mass of most valuable information, sees the light. Fr. Schmidt contributes to this volume a sketch of the tragic life of the author, who was exiled to Siberia after the Polish insurrection of 1863; then, after several years spent in hard labour, was allowed to make his memorable journeys, and was permitted to come to St. Petersburg in 1876. He was not allowed, however, to remain in the Russian capital, and being compelled to return to the land of exile, he poisoned himself at the age of forty-four. An excellent portrait of this remarkably energetic worker is given in the volume which contains his posthumous work.

A SUMMARY of recent advances in the photography of air waves, formed by flying projectiles, is given in *Engineering* for August 12, accompanied by a number of fine illustrations. Perhaps the most interesting recent development of the subject is to be found in the attempts of Mach to study the phenomena by means of interference bands. From these it is concluded that though the air is pushed forward and outward by the projectile, the compression does not, in the case of a steel shell, correspond to more than a pressure of a fifth of an atmosphere; further, there is, indeed, something like a vacuum immediately behind the projectile, but this vacuum only extends through a short distance.

A PRELIMINARY note on the influence of electricity on the sedimentation of turbulent liquids, is contributed to the *Bulletin de l'Académie royale de Belgique* by M. W. Spring. After observing that water will sometimes hold finely divided matter of greater density than itself in suspension for an indefinite time, but that the presence of small quantities of salts in solution, or heating the liquid, will suffice to bring about precipitation, M. Spring states that a medium formed of pure water containing finely divided silica, or other non-electrolytic matter, begins to clarify gradually as soon as two platinum electrodes are plunged into it and a current passed through them. From this experiment the author proposes to develop a theory according to which the turbulent state is caused by a modification of the electric state of the finely divided particles, caused by the change in the energy of attraction of the matter forming them, consequent on disintegration. The presence of a dissolved salt or acid renders the liquid a conductor, and the discharge of electricity causes the particles to collect in flocculent masses; an explanation in accordance with Bodländer's view, that only electrolytes are capable of producing clarification. Again, convection currents produced by warming the liquid give rise to electric currents which also have the same effect. M. Spring proposes to go further and explain the fall of rain accompanying thunderstorms on the same theory. We wonder if he has thought of trying the effect of Röntgen rays on turbulent liquids; if not, his present theory suggests that the results of doing so might be interesting.

IN Tasmania, writes Mr. Stuart Dove in *Nature Notes*, the "blue-tongued lizard," the *Tiliqua nigrolutea* of naturalists, takes the place of that noted cobra-destroyer, the Indian mongoose. The blue-tongued lizard is a stout formidable-looking animal much given to lying about the bush roads and tracks, asleep in the sun, which heaviness of disposition has earned for it the name of "sleeping lizard." But should a snake come in sight, the sleepiness disappears instantly and every nerve of the lizard seems on the alert, every sinew toughened to meet the enemy. The snake usually tries to get away, but the lizard prevents it, and a fight commences, the two reptiles darting and dodging and savagely snapping at one another. The snake soon shows signs of being exhausted, and the lizard then twists it over with a quick dexterous turn and gives it a *coup de grace*. The lizard afterwards takes the head of the snake between its strong jaws and slowly devours the dead reptile, after which he retires to the shelter of a hollow log to sleep off the repast.

A SHORT but interesting paper by Prof. W. C. McIntosh, on the memory of fishes, is referred to in the *Journal of the Royal Microscopical Society* (August). Prof. McIntosh refers to "the behaviour of a large grey skate in its endeavour to escape over a trawl-beam more than fifty feet long, which had been arrested in its rise—just above the surface of the sea—by a temporary block in the machinery. The dexterity with which it skimmed to and fro along the beam to find where it dipped sufficiently during the movements of the ship to enable it to glide over was a study. . . . If those who have given a green cod of six or eight inches a particular kind of 'scale-back' (a kind of worm), and noticed, firstly, how eagerly it seized it, then tested it in its pharyngeal region, and soon ejected it, never again taking that species into its mouth, they would be slow to deny that fishes, and even very young fishes, have a memory." A number of very suggestive cases are given, and the author concludes: "With regard to the absence of cortex of the brain in fishes, this is probably only a question of degree—easily understood by referring to the descriptions and figures of the brain in the salmon and the wolf-fish. Besides, who has proved that the function of memory depends on the brain-cortex of the human subject? I have seen many a curious case in the pathological room, the history of which would not have led us to this conclusion."

Mr. W. L. Sclater, Director of the South African Museum, reports that the state of the collections is satisfactory, and increasing use is being made of the museum by workers in different branches of natural science. The collections are now in the new museum building, which was formally opened on April 6. During the year covered by the report, 6380 specimens were added to the collections, 289 of them being species new to the museum. A complete list of the acquisitions to each department is given in the report. The number of insects received by the department of entomology was 2309, representing 766 species. As usual, the order Coleoptera predominates in the accessions, and Mr. L. Péringuey is able from the data now available to estimate that the number of South African Coleoptera will prove to be no less than 12,000. Mr. Péringuey refers to the interesting discovery of the existence of a representative of the curious family *Embiidæ* of the order Neuroptera, not before recorded in South Africa; and the curious parallelism of some coleopterous forms inhabiting the Cape and the Canary Islands, as exemplified by captures made by M. A. Raffray in the immediate vicinity of Cape Town. M. Raffray lately discovered a species of *Metophthalmus* (family Lathrididæ), three species of which are represented in the Canary Islands; he also discovered an eyeless species of Weevil (nov. gen.), and another the eyes of which have only six facets. These insects, belonging to the sub-family *Cossoninæ*, are very closely allied to similar ones occurring in the Canary Islands, and which are also found in the extreme south of Europe. Wollaston, as far back as 1861, described a Colydid (gen. *Cossyphodes*) from the Cape, belonging to a genus known at the time as occurring only at Madeira. Another species was later on discovered in Abyssinia, It is a singular coincidence that both *Cossyphodes* and *Metophthalmus* should be discovered in such opposite directions. Mr. Péringuey thinks the true explanation is that the minute insects of Africa have not yet been properly collected, and that the genera mentioned will be found to have a larger area of distribution than at first imagined.

Since the Liverpool Biological Committee transferred its headquarters to Port Erin, the station on Puffin Island has been worked by a committee of residents in North Wales, under the direction of Prof. White, of Bangor. The report for 1896 and 1897, which has recently appeared, shows that the Committee is extending its sphere of action to the study of the fauna and flora of the North Welsh *littoral*, as well as to the archæology of Puffin Island itself. It contains papers by Prof. Phillips on the brown seaweeds of Anglesey and Carnarvonshire, on an interesting form of *Ectocarpus confervoides*, and on a new variety of the alga *Epicladia flustræ*; by Mr. Daniel A. Jones, on the moss flora of the Harlech coast; by Prof. White, on some fishes observed in the Menai Straits, and on Welsh fishery exhibits at the Imperial Institute; by Mr. Harold Hughes, on excavations on Puffin Island; and a description, by Sir William Turner, of a skeleton recently discovered in the course of these excavations.

Mr. Bernard Quaritch has just issued a catalogue of many rare and valuable works on zoology offered for sale by him.

In addition to the usual bi-monthly summary of current researches relating to zoology, botany, and microscopy, the *Journal of the Royal Microscopical Society* for August contains several short papers of special interest to microscopists. The President, Mr. E. M. Nelson, contributes an article on the errors to be corrected in photographic lenses, and Mr. P. E. Bertrand Jourdain describes a new apochromatic objective constructed without the use of fluorite; a method of adjusting the sizes of the coloured images yielded by the Cooke lens; and the construction of the planar lens, and its use in low-power photomicrography.

In his "Electricity and Magnetism," published at St. Louis by the John L. Rowland Book and Stationery Co., Prof. Francis E. Nipher gives a mathematical exposition of the fundamental principles of these subjects, for students who have commenced the calculus. A second edition of the volume, revised and with additions, has lately appeared, and the electrical engineer who is first of all a student, can acquire from it a sound knowledge of the machinery of mathematics, while the results may be safely applied to the work of designing electrical machinery.

We have received a copy of a statement, being a report to the Lawes Agricultural Trust Committee, prepared by Sir J. Henry Gilbert, F.R.S., on the origin, plan, and results of the field and other experiments conducted on the farm and in the laboratory of Sir John B. Lawes, F.R.S. Other evidence of the activity of the investigators at Rothamsted is afforded by three papers, which have come to us with Sir Henry Gilbert's report, dealing with the growth of sugar beet and the manufacture of sugar in the United Kingdom; the valuation of the manures obtained in the consumption of foods for the production of milk; and, the Royal Commission on agricultural depression, and the valuation of unexhausted manures.

A volume of "Agricultural Statistics of British India, for the years 1892–93 to 1896–97," compiled by the Statistical Bureau of the Government of India, has just been published. From the immense amount of material therein contained, we note one or two points of interest concerning the progress of cultivation of tea, coffee, and cinchona from 1885 to 1897 in British India and the native States. In 1885 the number of acres upon which tea was cultivated was 283,925, and the total production of tea was 71,525,977 lbs. In 1896 the number of acres under tea was 433,280, and the total production was 156,426,054 lbs. Coffee does not show the progressive increase of cultivation exemplified by tea. In the year 1885 the number of acres under coffee was 237,457, and the yield 34,959,295 lbs., but in 1896 the larger area of 289,084 acres only produced 26,086,902 lbs. As to cinchona, the number of acres under cultivation, and the number of trees in permanent plantations, have decreased since 1885, the quantity of bark collected in 1896-97, viz. 1,491,566 lbs., being the least obtained since 1889.

The third part of vol. liv. of the *Quarterly Journal of the Geological Society* has just been published. From the large number of papers which are here printed, two or three are especially worthy of mention. Mr. T. Codrington discusses the submerged Rock-valleys in South Wales, Devon, and Cornwall. Mr. F. W. Harmer gives the results of a valuable series of borings which he has made with the object of arriving at a satisfactory conclusion as to the relation of the Lenham Beds and the Coralline Crag. Prof. Bonney deals with the Garnet-Actinolite schists on the southern side of the St. Gothard Pass. Mr. F. A. Bather elucidates the structural characters and affinities of *Petalocrinus*, and shows that its base is dicyclic and not monocyclic, as originally thought. Moreover, axial canals, covering-plates, the articular facet, and various minor structures are described in this genus for the first time. Miss G. L. Elles' exhaustive account of the Graptolite-fauna of the Skiddaw Slates confirms the chief conclusions of Prof. Nicholson and

Mr. Marr, though in several matters of detail different results are reached. Other important papers complete what is a particularly interesting issue of the *Journal.*

THE additions to the Zoological Society's Gardens during the past week include two Maholi Galagos (*Galago maholi*), a Bosch Bok (*Tragelaphus sylvaticus*, ♂), two Cape Zorillas (*Ictonyx zorilla*), a Hoary Snake (*Pseudaspis cana*), two Rough-keeled Snakes (*Dasypeltis scabra*), twelve Crossed Snakes (*Psammophis crucifer*), two Rufescent Snakes (*Leptodera hotambœia*), two Smooth-bellied Snakes (*Homalosoma lutrix*), two Puff Adders (*Bitis arietans*) from Port Elizabeth, Cape Colony, presented by Mr. J. E. Matcham; a Fat-tailed Sheep (*Ovis aries*, ♂, var.) from Cape Colony, presented by the Hon. Sir James Sivewright, K.C.M G.; an African Civet (*Viverra civetta*) from West Africa, presented by Lieut. Carroll and Major Arthur Festing; a —— Gannet (*Sula*, sp. inc.), captured at sea, presented by Captain Ernest W. Burnett; two Alligators (*Alligator mississippiensis*) from North America, presented by Mr. O. Moser; a Common Viper (*Vipera berus*), two Common Snakes (*Tropidonotus natrix*), British, presented Mr. W. F. Blandford; twelve African Walking Fish (*Periophthalmus koelreuteri*) from West Africa, presented by Dr. H. O. Forbes; a Reticulated Python (*Python reticulatus*) from Malacca, two Indian Pythons (*Python molurus*) from India, deposited; an Indian Chevrotain (*Tragulus meminna*, ♂) from India, purchased; a Burrhel Wild Sheep (*Ovis burrhel*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN SEPTEMBER:—

September 5. 16h. 44m. to 17h. 41m. Occultation of 66 Arietis (mag. 6·1) by the moon.
8. 10h. 52m. to 11h. 42m. Occultation of DM + 24° 1033 (mag. 6) by the moon.
9. 1h. 31m. to 2h. 19m. Occultation of Mars by the moon.
10. 14h. 5m. to 14h. 30m. Occultation of 79 Geminorum (mag. 6·5) by the moon.
12. 11h. 27m. Minimum of Algol (β Persei).
15. Venus. Illuminated portion of disc 0·521. Diameter 23″ 2.
15. Mars. Illuminated portion of disc 0 880. Diameter 6″·8.
15. 8h. 16m. Minimum of Algol (β Persei).
17. Saturn. Outer minor axis of outer ring, 16″·43.
21. 3h. Mercury at greatest western elongation (17° 51′).
21. 5h. Venus at greatest eastern elongation (46° 27′).
26. Vesta 20′ S. of Saturn.
28. 13h. 39m. to 14h. 44m. Occultation of 16 Piscium (mag. 5·6) by the moon.

The planet Mercury will be favourably presented as a morning star between about September 18 and 27. The time of his rising compared with that of the sun will be as under:—

Date.	Mercury rises.		Sun rises.		Interval.	
	h.	m.	h.	m.	h.	m.
September 18	4	3	5	40	1	37
19	4	3	5	42	1	39
20	4	2	5	43	1	41
21	4	3	5	45	1	42
22	4	4	5	46	1	42
23	4	6	5	48	1	42
24	4	9	5	49	1	40
25	4	13	5	51	1	38
26	4	16	5	53	1	37
27	4	20	5	55	1	35

THE GREAT TELESCOPE FOR THE PARIS EXHIBITION.—We gather from an article in *La Nature*, August 27, that M. Gautier, the well-known optician, is making good progress with the construction of the giant telescope intended for the Great Exhibition at Paris in 1900. The aperture will be 1·25 metres (49·2 inches), and the focal length 60 metres (196 feet 10 inches), while the estimated cost is 1,400,000 francs. An equatorial mounting and dome for such a gigantic instrument may well be considered impracticable, and accordingly the telescope itself will be rigidly fixed in a horizontal position on supports of masonry, and will receive the light of the heavenly bodies after reflection from a movable plane mirror 2 metres in diameter. The plane mirror is 13 inches thick, and weighs 3600 kilogrammes; and it is curious that of twelve discs cast for the purpose, the first one turned out to be the best. This has been in process of grinding for seven months, and is not yet finished.

There will be two objectives, one photographic and one visual, which will be easily interchangeable at will. It is expected that a magnifying power of 6000 will be usefully employed, and that occasionally a power of 10,000 may be used. As the highest power available in the largest existing telescope does not exceed 4000, the new instrument, if it be the success that every one will wish, should have a wide field of usefulness.

A NEW VARIABLE STAR.—In *Ast. Nach.*, No. 3512, Prof. Ceraski, Director of the Moscow Observatory, announces the discovery, by Madame Ceraski, of a new variable star. The variability was detected by a comparison of photographs, and has been confirmed by visual observations. Its estimated position is in R.A. 21h. 6·9m., Decl. + 82° 28′ (1855); that is, not far from 76 Draconis. The range of variation is not stated, but it is mentioned that on July 25 it was of the tenth magnitude.

MINOR METEORIC RADIANTS.—In view of the large amount of attention which will probably be directed to meteoric displays during the next few years, Mr. Denning summarises in *Ast. Nach.*, No. 3513, the positions of the radiant points of the minor showers visible during the principal meteoric epochs. The catalogue comprises fifty radiants observable at each of the six periods corresponding to the displays of Quadrantids, Lyrids, Perseids, Orionids, Leonids and Geminids. As the Andromedes fall near and between the Leonids and Geminids, a separate list is unnecessary for this epoch. It is seen from the table that some of the positions for radiants are almost the same at different epochs, and Mr. Denning again draws attention to his conclusion that "certain radiants are actively maintained (though possibly with varying or intermittent intensity) over considerable intervals of time, during which their positions are quite stationary among the stars." The list will be invaluable to those who take up observations of shooting-stars.

THE INTERNATIONAL CONGRESS OF ZOOLOGISTS.

THE fourth International Congress of Zoologists, under the patronage of H.R.H. the Prince of Wales and the presidency of the Right Hon. Sir John Lubbock, Bart., M.P., F.R.S., which met last week at Cambridge, may be chronicled as a success, as well from the social as the scientific point of view. The discussions were animated, the sectional papers of general interest, and the attendance was large and representative. The severity of the zoological discussions was relieved by frequent social festivities, of which the reception at the Guildhall by the Mayor of Cambridge on Monday, and the open air party at the Botanic Gardens on Thursday afternoon, were especially noteworthy.

The Congress is a triennial one, and has already been held at Paris, Moscow and Leyden. This is the first occasion that the Congress has met on English soil, and it is gratifying to find that more members were in attendance last week than were present at any of the three preceding Congresses. The programme for the week was drawn up in such a way that the topics of general interest were discussed in the mornings before the whole body of the members, while those of more limited interest were divided into four sections—(A) General Zoology, (B) Vertebrata, (C) Invertebrata, excepting Arthropoda, (D) Arthropoda, and were read in the afternoons.

Tuesday, August 23.—Sir John Lubbock, in opening the Congress, expressed his regret at the absence through continued ill-health of Sir William Flower, who, at the Leyden meeting in 1895 was made President-Elect for the present Congress.